

Final Report

Arizona Grain Research and Promotion Council

December, 2019

Small Grains Variety Testing, 2019

Mike Ottman
University of Arizona

Small Grains Variety Evaluation at Maricopa, Eloy, and Yuma 2019

M. J. Ottman

Summary

Small grain varieties are evaluated each year by University of Arizona personnel. The purpose of these tests is to characterize varieties in terms of yield and other attributes. Variety performance varies greatly from year to year and several site-years are necessary to adequately characterize the yield potential of a variety. A summary of small grain variety trials conducted by the University of Arizona can be found online at <https://extension.arizona.edu/sites/extension.arizona.edu/files/pubs/az1265-2019.pdf>

Introduction

Small grain varieties were tested as part of the on-going effort to assess variety productivity and characteristics. Barley and durum commercial cultivars were tested. The purpose of these tests is to characterize varieties in terms of yield potential, quality, and other characteristics. Variety trials on agricultural experimental stations do not substitute for localized on-farm testing of new varieties. Varieties are known to differ in their response to specific management regimes and weather conditions. A summary of small grain variety trials conducted by the University of Arizona is available from your local Cooperative Extension office or online at <https://extension.arizona.edu/sites/extension.arizona.edu/files/pubs/az1265-2019.pdf>

Procedure

Barley and durum varieties were evaluated at Maricopa by the University of Arizona (UA), at Eloy by Arizona Plant Breeders (APB), Yuma by Second Nature Research (SNR), and Paloma by Highland Specialty Grains (HSG). The seed was planted with a cone planter in plots 20 ft long in seven rows spaced 7 inches apart. The seeding rate was approximately 100 lbs/acre for durum and 85 lbs/acre for barley. The experimental design was a randomized complete block with 3-5 replications and 4-5 barley and 10-20 durum entries. Growing conditions are listed in Table 1.

The following data was collected: grain yield, test weight, seed weight, plant height, lodging, grain protein, HVAC (durum only), and flowering date (Yuma only). Grain was harvested with a small plot combine and yields are expressed on an "as is" moisture basis. Test weight was calculated from the weight of 1 pint of grain. Seed weight was determined from 200 seed. HVAC was determined from 10 g of seed. Grain protein was determined from total N multiplied by 6.25 for barley and 5.7 for durum and expressed on a 12% moisture basis.

Discussion

Yield and plant characteristics of the varieties are presented in Tables 2-5. Several locations and years are needed to accurately assess variety performance. The results of this trial are most useful when combined with data from previous years. A summary of small grain variety trials conducted by the University of Arizona can be found online at <https://extension.arizona.edu/sites/extension.arizona.edu/files/pubs/az1265-2018.pdf>.

Acknowledgments

Financial support for this project was received from the Arizona Grain Research and Promotion Council and the Arizona Crop Improvement Association. The technical assistance of Said Attalah and Joshua Sutter is greatly appreciated.

Table 1. Cultural practices for the small grains variety trials at the various locations.

Cultural information	Maricopa (UA)	Yuma Early Planting (SNR)	Yuma Late Planting (SNR)	Eloy (APB)
Previous crop	Fallow			
Soil texture	Sandy loam	Clay loam	Clay loam	Sandy loam
Planting date	12/18/18	12/26	12/11	
Irrigation dates and amounts	12/18: 7.11 in 2/1: 5.10 in 3/1: 2.49 in 3/15: 3.42 in 3/29: 3.55 in 4/12: 4.56 in 4/26: 6.08 in SUM = 32.3 in	12/26: Sprinkle 1/28: Flood 2/28: Flood 3/15: Flood 4/03: Flood 4/17: Flood	1/11: Sprinkle 2/08: Flood 3/08: Flood 3/26: Flood 4/08: Flood 4/22: Flood	
Nitrogen application dates and amounts	<u>46-0-0</u> 12/18: 50 lbs N/A 2/01: 50 lbs N/A 3/01: 50 lbs N/A 3/15: 50 lbs N/A 3/29: 50 lbs N/A SUM = 250 lbs N/A	<u>32-0-0</u> 1/28: 70 lbs N/A 2/28: 70 lbs N/A 3/15: 70 lbs N/A 4/03: 65 lbs N/A SUM = 275 lbs N/A	<u>32-0-0</u> 2/8: 70 lbs N/A 3/8: 70 lbs N/A 3/26: 70 lbs N/A 4/8: 65 lbs N/A SUM = 275 lbs N/A	
Phosphorus application date and amount	<u>0-45-0</u> 12/18: 50 lbs P ₂ O ₅ /A	None	None	
Pesticides	None	2/8: Affinity and Aim herbicides	2/15: Affinity and Aim herbicides	

Table 2. Barley yield results from Eloy (APB), Maricopa (UA), and Paloma (HSG), 2019. Grain yield at the Maricopa location was not reported due to extensive bird damage.

Entry	Source	Grain yield lb/acre	Test weight lb/bu	Seed weight mg	Plant height inches	Lodging %	Grain protein %
<u>Eloy</u>							
Baretta	APB	7727	50.7	44	26	0	12.4
Kopious	APB	7158	50.3	38	23	3	11.8
Cochise	HSG	7020	52.5	44	23	0	14.1
Nebula	HSG	6690	53.6	47	27	5	13.7
Avg	---	7149	51.8	43	25	2	13.0
CV (%)		10.4					
LSD _{.05}		1185					
<u>Maricopa</u>							
Baretta	APB	---	47.4	44	34	12	12.8
Kopious	APB	---	48.8	47	33	3	11.1
Cochise	HSG	---	48.3	42	34	13	10.5
Nebula	HSG	---	53.4	48	36	1	13.4
Chico	HSG	---	47.4	40	30	0	11.6
Avg	---	---	49.1	44	33	6	11.9
CV (%)							
LSD _{.05}							
<u>Paloma</u>							
Baretta	APB	6943	49.4	---	31	23	---
Kopious	APB	7022	50.8	---	29	10	---
Cochise	HSG	6336	52.9	---	30	27	---
Nebula	HSG	6996	49.2	---	33	30	---
Avg	---	6825	50.6	---	31	23	---
CV (%)		9.5					
LSD _{.05}		1301					

Abbreviations: APB = Arizona Plant Breeders, HSG = Highland Specialty Grains, UA = University of Arizona.

Table 3. Durum variety yield results from APB at Eloy, 2019.

Entry	Source	Grain yield	Test weight	Seed weight	Plant height	Lodging	HVAC	Grain protein
		lb/acre	lb/bu	mg	inches	%	%	%
Alberto	APB	8200	63.6	47	26	3	88	12.8
Kronos	APB	7800	65.2	61	31	10	88	12.9
Tiburon	APB	8530	65.3	44	30	10	88	13.0
Westmore HP	APB	8715	65.2	49	33	20	98	13.0
Platinum	Dunn	8206	65.4	45	28	5	96	13.3
Phoenix	Dunn	8310	64.4	60	35	18	90	13.2
Topper	Dunn	8779	66.1	44	35	3	94	12.3
Powell	SNR	8547	64.8	44	30	0	98	13.5
WB-Mead	SNR	9320	65.9	52	37	10	92	13.0
WB-Mohave	SNR	8015	65.4	49	34	5	98	13.2
Avg	---	8442	65.1	50	32	8	93	13.0
CV (%)		4.6						
LSD _{.05}		569						

Abbreviations: APB = Arizona Plant Breeders, Dunn = Dunn Grain, SNR = Second Nature Research

Table 4. Durum variety yield results from UA at Maricopa, 2019. Grain yield at the Maricopa location was not reported due to extensive bird damage.

Entry	Source	Grain yield lb/acre	Test weight lb/bu	Seed weight mg	Plant height inches	Lodging %	HVAC %	Grain protein %
Alberto	APB	---	62.6	48	30	0	92	12.1
Kronos	APB	---	61.3	50	35	26	100	12.8
Tiburon	APB	---	62.1	49	36	16	100	13.6
Westmore HP	APB	---	63.2	43	37	38	100	13.2
Platinum	Dunn	---	62.9	41	34	21	94	12.7
Phoenix	Dunn	---	62.3	39	42	20	96	14.2
Topper	Dunn	---	64.3	44	39	0	100	12.7
Powell	SNR	---	64.3	48	35	27	96	12.5
WB-Mead	SNR	---	63.1	45	35	16	96	13.2
WB-Mohave	SNR	---	63.4	42	37	19	98	12.8
Desert King	UC	---	64.1	54	37	1	96	13.5
Miwok	UC	---	64.3	55	37	4	94	13.1
ASC-120	Allstar	---	---	42	41	5	100	14.3
ASC-121	Allstar	---	---	40	34	0	100	12.8
ASC-122	Allstar	---	---	47	36	80	94	13.2
ASC-123	Allstar	---	62.8	49	40	0	92	13.4
ASC-124	Allstar	---	62.1	44	35	5	94	12.4
ASC-129	Allstar	---	62.8	47	38	53	88	11.6
Maestrале	Allstar	---	63.9	49	42	40	96	12.7
Saragolla	Allstar	---	63.5	46	36	35	92	12.6
Avg	---	---	63.0	46	37	20	96	13.0

Abbreviations: APB = Arizona Plant Breeders, HSG = Highland Specialty Grains, SNR = Second Nature Research, UC = University of California

Table 5. Durum variety yield results from SNR at Yuma planted early on December 26 and late on January 11, 2019.

Entry	Source	Grain yield lb/acre	Test weight lb/bu	Seed weight mg	Plant height inches	Lodging %	HVAC %	Grain protein %	Flowering
<u>Early plant</u>									
Alberto	APB	8159	62.1	47	30	10	100	16.0	4/07
Kronos	APB	8043	63.4	54	32	77	100	15.2	3/31
Tiburon	APB	8062	63.0	50	34	20	98	15.1	4/06
Westmore HP	APB	6747	63.3	40	36	90	100	17.0	4/02
Platinum	Dunn	8023	64.4	44	28	33	100	14.9	4/09
Phoenix	Dunn	7269	63.2	39	34	67	98	15.2	4/03
Topper	Dunn	8971	64.6	42	36	23	92	13.6	4/10
Powell	SNR	9125	64.4	49	32	17	100	15.5	4/02
WB-Mead	SNR	8835	65.3	52	33	20	98	16.0	4/13
WB-Mohave	SNR	7695	63.9	49	33	27	100	16.9	4/04
Desert King	UC	8777	65.1	48	33	17	96	14.1	4/10
Miwok	UC	8893	65.3	55	33	10	96	15.0	4/10
Avg	---	8217	64.0	47	33	34	98	15.4	4/06
CV (%)		5.2							
LSD _{.05}		730							
<u>Late plant</u>									
Alberto	APB	7418	55.8	---	27	20	---	14.4	---
Kronos	APB	7498	57.2	---	30	53	---	14.0	---
Tiburon	APB	7022	56.0	---	31	27	---	13.8	---
Westmore HP	APB	7550	55.8	---	31	83	---	15.1	---
Platinum	Dunn	7445	55.5	---	29	40	---	13.9	---
Phoenix	Dunn	7366	57.4	---	36	43	---	13.6	---
Topper	Dunn	7630	58.8	---	33	23	---	13.3	---
Powell	SNR	8184	60.8	---	32	27	---	14.1	---
WB-Mead	SNR	7762	59.3	---	33	30	---	13.9	---
WB-Mohave	SNR	7207	59.3	---	33	33	---	14.6	---
Desert King	UC	7392	60.4	---	33	43	---	13.2	---
Miwok	UC	8606	59.3	---	33	43	---	13.5	---
Avg	---	7590	58.0	---	32	39	---	14.0	---
CV (%)		9.7							
LSD _{.05}		1244							

Abbreviations: APB = Arizona Plant Breeders, HSG = Highland Specialty Grains, SNR = Second Nature Research, UC = University of California